Agile Business Analysis

Make Programming Sexy

~~avoid print («Hello, World!»)~~

Master of Science in Business Information Systems

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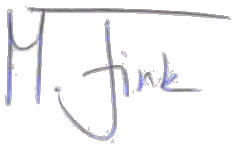
City, Date: Olten, 19 January 2019

I. Declaration of Authenticity

We confirm that this group paper was performed autonomously by us using only the sources, aids and assistance stated in the report, and that quotes are readily identifiable as such.

Olten, 19 January 2019

Lawrence Morillo



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1 Introduction

This report shows how we, in the role of the Product Owner and Business Analyst, performed a real use case under the prerequisite of the agile project methodology. As teaching aids and knowledge support, we have mainly used the BABOK Guide (International Institute of Business Analysis, 2015) in combination with regular exchanges of supervisors. Since this report focuses on the approach rather than the product, it has been divided into five Knowledge Areas, which can also be found in the BABOK Guide (International Institute of Business Analysis, 2015). Knowledge areas are a set of coherent and logically related (but not sequentially) related tasks. These tasks describe activities that helps to achieve the objective of a related knowledge area. The five of the six knowledge areas on which this report is based are exposed: Elicitation and Collaboration, Requirements Lifecycle Management, Strategy Analysis, Requirements Analysis and Design Definition and Solution Evaluation (International Institute of Business Analysis, 2015).

1.1 Summary of the use case

When selecting the case, we have taken up a topic from the FHNW. This case is under the care of Dr. Prof. Knut Hinkelmann, who appears in our case as head of the study program Business Information Systems (BIS) and project sponsor. The problem addresses the shortage of IT specialists in Switzerland. ICT-Berufsbildung Schweiz announced the results of the ICT Expert Study on 13 September 2018. The study forecasts an additional need for 40,000 skilled workers in 2026. Despite efforts in education and training, this demand cannot be met (Camenzind, 2019). Other demand forecasts show that there are still more training places available, and that in 2024 there will be a shortage of 25,000 ICT specialists (Handelszeitung, 2016). The BSc Business Information Technology and MSc Business Information System programs focus on educating people who have the skills to understand the business and technical side of the business. The development further into the technical or business direction is not excluded. In general, it was found that a deeper technical knowledge enhances the profile. Especially, in programming it can be observed that students have problems with understanding, which makes them doubt today's way of teaching programming. In most cases such modules have a deterrent effect on the students, which leads to a loss of interest in technical computer science. In this case we want to address this issue and find out how to promote this interest, which ultimately meets the economy and the demand for specialists.

1.2 Approach

To determine the approach or methodology of our project, the Stacey Matrix by Ralph Douglas Stacey was used. Based on the requirements "What" - from clear to unclear and the technology - and "How" - from known to unknown - the project can be classified. In our case the requirements are are sometimes clear and sometimes not clear and the approach or the way how to solve the problem is between unknown. Therefore, according to the Stacey Matrix our project can be classified as at least "complicated" and hence, an agile approach is the appropriate methodology for our project. There is a fixed timeline for the project from September 30 to December 21. During this time, the requirements are collected and solution approaches are worked out. Those solution approaches are continuously expanded and improved in consultation with the stakeholders. These steps are done with the aim of achieving a minimum valuable product (MVP) as the result after each sprint. The tasks are documented on a Kanban Board in Trello and constantly updated by the Business Analysts and managed by the Product Owner.

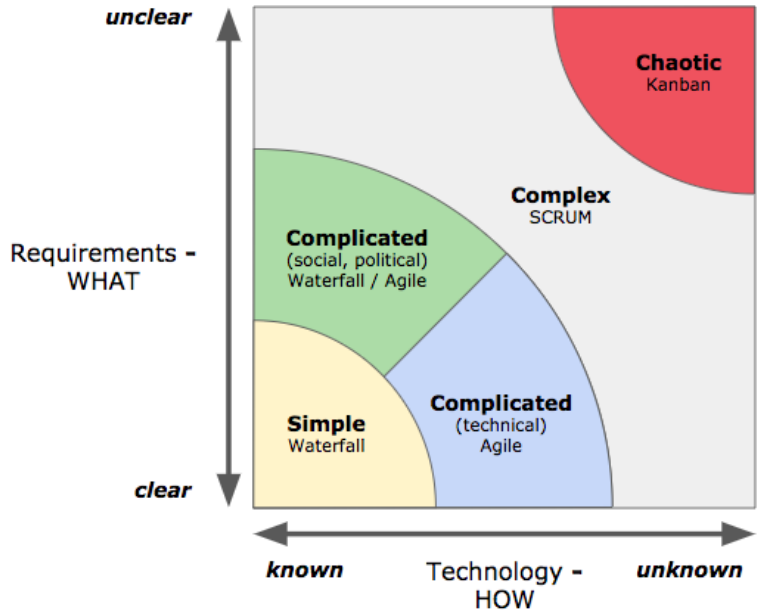


Figure 1: Stacey Matrix

2 Elicitation and Collaboration

2.1 Which stakeholders were involved and why?

As described in BABOK Guide Version 3 (International Institute of Business Analysis, 2015), as first step we conducted the tasks mentioned as part of the Elicitation and Collaboration Knowledge Area. The objective in this stage was to gain information about the as-is situation. For this purpose, we first arranged a short meeting with project sponsor, Prof. Dr. Knut Hinkelmann. The goal of this meeting was to understand and discuss the current (as-is) and potential future (to-be) state. Another objective was to obtain information about potential other stakeholders. Those stakeholders were required to gain information, build requirements out of their inputs and finally to confirm those requirements.

Not every task of Elicitation and Collaboration Knowledge Area was considered in our approach. The following section provides an overview about the tasks and goals, the team conducted in this stage.

2.2 Prepare for Elicitation:

As a first step, the team discussed the potential stakeholders in a brainstorming session. The stakeholders were discussed based on their knowledge areas – modules taught - and importance to understand the as-is situation. The latter was especially important in defining the stakeholder representing the student's points of view. Then in a second step the main stakeholders were identified and selected within the team. In this stage irrelevant stakeholders were eliminated as otherwise too many stakeholders could make the elicitation phase more difficult.

Finally, the determined stakeholders were grouped into two stakeholder group (students and lecturers).

After that, based on the stakeholder group corresponding questionnaire were created with stakeholder specific questions. Importance was given on the pre-information to ensure that stakeholders understand the goal of this project. The questionnaire was created in Google Forms and sent out via E-Mail to the stakeholder groups. The stakeholders obtained one-week time to complete the questionnaire.

2.3 Conduct Elicitation:

Once the deadline for the questionnaire has reached. The gained information (key phrases) from the questionnaire were transferred into an excel spreadsheet.

As a second step the team started to evaluate the key words to prioritize the stakeholder needs and identify potential solutions that may meet those needs.

2.4 Confirm Elicitation Results:

As a next step, we organized a call with Dr. Andreas Martin (Professor at FHNW) to confirm our elicitation results. We guided the call by informing him about the outcome from the questionnaire and requested him to share his opinion to our results.

We also arranged a focus group with four BSc BIS students to confirm our elicitation results. This was done by creating charts based on their feedback introducing those illustration as part of this focus group meeting. We then further discussed their view on our results.

In both settings the main purpose was to catch any missing information and to close those gaps.

2.5 Which stakeholders were involved and why?

Domain Subject Matter Expert:

Dr. Prof. Knut Hinkelmann and Dr. Prof. Holger Wache having the expertise in the situation of our business objectives and giving us guidance about which other sources should be conducted to get information.

End User:

Lecturers teaching BSc BIS sharing their view on the current situation and providing us with potential future needs to be considered in the business objectives.

Customers:

Graduated BSc BIS Students sharing their experience from the studies and how they could connect their knowledge in their working environment.

Current BSc BIS Students sharing their feelings and experience during their studies.

2.6 How did you obtain information from stakeholders?

Document Analysis:

Documents regarding the BSc BIS studies at FHNW and a MSc Thesis written by Tatevik Brändlin were analysed to understand the current situation and already performed surveys and observation regarding this topic.

Interviews:

Interviews were conducted with current BSc BIS Students and Dr. Martin Andreas (Lecturer at FHNW) to gain more knowledge about their point of view on the current study programme at FHNW.

Questionnaire:

Two different questionnaires (targeting the stakeholder group – students and lecturer) were created and shared via e-mail to gather feedback from stakeholders about their satisfaction and point of view on the current study programme at FHNW.

2.7 How did you communicate with stakeholders?

Communication with the stakeholder were conducted face-to-face (interviews with Students and Domain Subject Matter Experts) over Skype and with the questionnaire.

2.8 Which techniques were applied and what are the experiences?

During the collaboration and elicitation phase different kind of techniques were conducted to address the stakeholder groups. Primary selection criteria for the techniques was how the stakeholder group can be attained most effectively to get the most powerful inputs out of them.

As a first step within the project team a brainstorming session was conducted to get a big picture about the understanding of the group members on the business objectives. Based on the first output clustering and topic elimination were conducted to keep the scope lean and achievable during the given timeframe.

Furthermore, the team did document analysis regarding the current situation to gain more information about research and observations already conducted on this topic.

From the document analysis the current study program was understood. Afterwards, the team performed a functional decomposition to break down the insights and to understand what topics are taught at which stage.

Finally, to understand the as-is situation interviews were performed and a questionnaire were created and shared with student and lecturers to gain knowledge about the current situation and the point of view by the corresponding stakeholder group.

3 Requirements Lifecycle Management

3.1 How were changes to requirements evaluated?

If we had any changes to the requirements, we followed the BABOK Requirements Life Cycle Management (International Institute of Business Analysis, 2015). This means, we first assessed and evaluated:

1. if the implications of the proposed requirements align with our overall strategy
2. if it increased the value of the solution
3. if it is feasible within our time given

Figure 5.0.1: Requirements Life Cycle Management

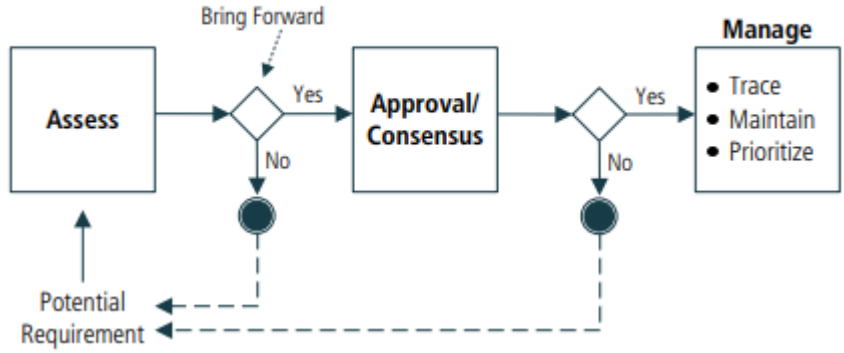


Figure 2: Babok Guidelines p. 76

If we considered change in the requirement to be important, we discussed within the group which priority it has and tried to get approval from the stakeholders or our coaches, who also acted as indirectly as stakeholders based on their experience (lecturing experience, former BSc BIS student).

We had a change requirement in mind, in which we did not have the consensus of every team member. This was building a prototype to better illustrate our product. Two business analysts started working on the prototype with the Rasperry Pi. However, after the session with our coaches Maja Spahic and Holger Wache, we concluded that the prototype was not a significant requirement for the product and it would not be feasible to create it with the current resources and time given.

We learned that if we detect new potential requirements, after the assessment, we should get the approval from the respective stakeholders immediately. Unfortunately, we did not do that with the prototype and lost valuable days, which could have been invested in more valuable tasks at that time.

3.2 How did you maintain and trace requirements?

Based on the Babok Guideline (International Institute of Business Analysis, 2015) requirements management tools are valuable to trace a large number of requirements. We did not have a large set of requirements; hence, we did not use any commercial tools such as JIRA, Confluence etc. to maintain our requirements. Basically, our requirements were maintained in an excel file.

In the first sprint, we had interviews with selected stakeholders and conducted document analysis, hence, the requirements were not difficult to maintain and trace. In the second sprint, since we expanded our target group, we conducted a questionnaire with all selected lecturers and current and former students of the BSc BIS. Since google forms allows to output the data into an excel, it was to our advantage that we already used excel to maintain our requirements. Hence, we were able to compare our new acquired requirement within the same tool and identify whether we had new requirements or if our requirements from the first sprint were confirmed. We used the same approach in the third sprint and documented it in the excel file.

The Babok Guideline emphasizes:

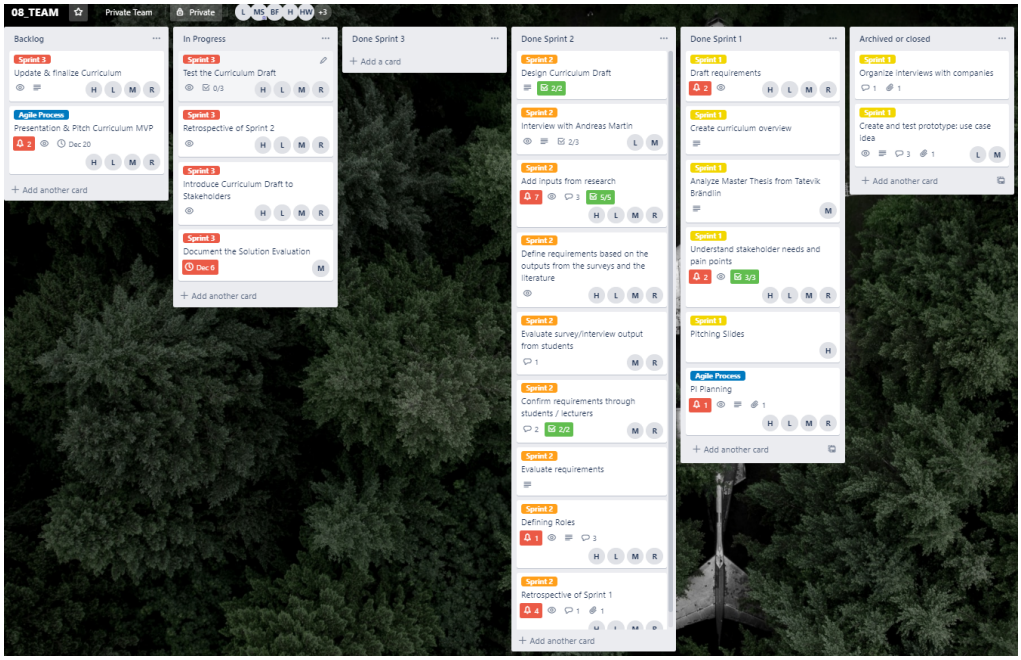
- to conduct maintenance
- to ensure the level of accuracy is retained
- to appropriately maintain the requirements “they must be clearly named and defined, and easily available to stakeholders”
- to maintain the relationships among requirements, sets of requirements, and associated business analysis information to ensure the context and original intent of the requirement is preserved.

These points were the responsibility of the business analysts within the group. In the second sprint, we realized that it was hard to compare our questionnaire with the requirements from the first sprint. In order, to fulfil these points, we had to transform the data from the questionnaire, so that we are able to compare it with the requirements from the first sprint. Hence, we coded, respectively categorized, each closed and open question in order to be able to trace it back to our initial requirements from the first sprint or to identify if we had another requirement.

The Babok Guideline (International Institute of Business Analysis, 2015) differs between several types of relationships that the business analyst can use for traceability, namely deriving, depending, validating. Based on our sprints, we recognized that our conducted interviews and questionnaires had more or less the same requirements as an output. Hence, our traceability approach was validating. This means that each requirement from another sprint was validating or emphasizing the previous requirement from the previous sprint.

3.3 How did you manage the backlog?

Our backlog was firstly managed in our WhatsApp group chat and then was cultivated in Trello. As a consequence, we realized that we had issues constantly updating our Trello, since we deemed more as a requirement than an assisting tool. However, during the coaching at the end of sprint two, we received guidance how to make valuable use of Trello, in order to help us instead of seeing it as a “burden”. We sorted the tasks into different colour. Each colour belongs to one of our sprints. This made it easier for us to link the output of the tasks to each sprint. Moreover, we delegated the responsibility to our product owner, Haris Besic, who maintained the relevancy of the backlog and ensured that we did not miss any deadlines. However, if one of the team members realized that a backlog was close to deadline, it was instantly communicated via the WhatsApp group chat.



4 Strategy Analysis

Based on the Babok Guide (International Institute of Business Analysis, 2015), the next step is about the Strategy Analysis. This chapter is about

> *the business analysis work that has to be performed to collaborate with stakeholders in order to identify a need of strategic or tactical importance, enable the enterprise to address that need, and align the resulting strategy for the change with higher- and lower-level strategies.* (International Institute of Business Analysis, 2015)

For this, the four tasks of this knowledge will be performed and described.

4.1 How did you analyse current state (stakeholder involvement)?

The first step is about understanding the business need and how it relates to the way the organisations is functioning today. It sets the baseline and the context for change.

Organisation Modelling:

First of all, we decided to analyse who the different stakeholders are, that should be included in the process of developing a solution for the given problem. We used the Organisation Modelling technique to find out what the different roles and responsibilities within the current state are.

Document Analysis:

For this, we were also analysing the BSc BIS study program as well as the MSc BIS thesis of Tatevik Brändlin. The goal was to understand and get a good understanding for the current situation.

Interviews / Focus Groups:

By performing different interviews and focus groups with the stakeholders, we were able to engage them in analysing the current state. The information provided gave us the opportunity to get a big picture view in order to understand the current situation better. We were able to analyse what the impacts of the problems were and what the benefits would be that a potential solution would bring. For example, we were able to identify based on the feedbacks from current students as well as lecturers that the current curriculum could be improved by shifting specific courses to another semester.

Questionnaire:

In addition to the interviews and focus groups, we sent out a questionnaire to the current students and lecturers as well as former students. The goal was to get the requirements verified that were defined based on the findings from the interviews and focus groups.

SWOT Analysis:

Last but not least, by performing a SWOT analysis we were able to quickly identify the opportunities a new approach could potentially bring and what the costs would be of doing nothing.

4.2 How did you define future state?

In this step, the goals as well as the objectives are defined that will demonstrate that the business need has been satisfied and defines what parts of the organisation need to change in order to meet those.

Document Analysis:

In order to define how the future state will look, we decided to do a market research and had a look at the following sources:

- **BlueJ book:** Free textbook about the Java programming language with a project-based approach
- **Zürcher Hochschule der Künste:** Master courses which are also based on projects
- **Berner Fachhochschule:** New master course about digital business administration which is based on live cases
- **Harvard Business University:** Analysing the different case study approaches which were used mainly in the business are

We compared the different approaches with the results of our interviews and questionnaires and defined based on that, how the future state could look like.

Interviews & Questionnaires:

As already described in the previous chapters (see 2.6 and 4.1), the information gathered from the interviews and the questionnaires were the basis for the definition of the future state.

Prototyping:

In a last phase, a prototyping workshop allowed us to bring all the findings together and create the first version of a prototype. It allowed us to create different options and then determine the potential value of each, in order to decide what the best option would be.

4.3 How was risk assessment done?

During the performance of this step, the uncertainties around the change will be analysed and the actions to address the risks are recommended.

Brainstorming for Risk Analysis:

Due to the fact, that we have analysed the current state and defined the future state the next step was to identify the risks before being able to choose what the change strategy will look. Taking all the information into consideration, we decided to brainstorm and do a risk analysis to identify what potential threats could be. We also then invited specific stakeholders to challenge these and give their inputs on sharpen them.

4.4 Define Change Strategy

The last step of the Strategy Analysis is about the gap analysis between the current and future state. Here the options for achieving the future state are assessed and the highest value approach for reaching this state are recommended.

Interviews / Questionnaires:

Based on the different interviews and questionnaires, we were able to define the requirements to build an approach draft, which was then shown and challenged to different focus groups. Here, it was important to combine the wide range of information into one document and idea, which will represent the needs of all people involved best.

Focus Groups:

Our strategy was to involve the different target groups in the development process. We decided to use focus groups and use an agile approach, by testing our prototype in several loops with different stakeholders and therefore further develop the final solution. Therefore, the new approach draft was challenged by the stakeholder groups lecturers and students. This helped us to verify our strategy as well as further develop the product.

5 Requirements Analysis and Design Definition

5.1 How were requirements specified?

Document Analysis:

Documents regarding the BSc BIS studies at FHNW and a MSc Thesis written by Tatevik Brändlin were analysed to understand the current situation and already performed surveys and observation regarding this topic.

Interviews:

Interviews were conducted with current BSc BIS Students and Dr. Martin Andreas (Lecturer at FHNW) to gain more knowledge about their point of view on the current study programme at FHNW.

Questionnaire:

Two different questionnaires (targeting the stakeholder group – students and lecturer) were created and shared via e-mail to gather feedback from stakeholders about their satisfaction and point of view on the current study programme at FHNW.

5.2 How are requirements prioritised?

For the basis of the prioritisation, the typical factors that influence the decision were used:

- Benefit
- Cost
- Risk
- Dependencies
- Urgency
- Regulatory

In addition, the following approaches were used to perform the task:

Decision Analysis:

In order to identify the high-value requirements, a decision analysis was performed within the group. Discussions were held until a consensus was found.

Prioritisation:

Due to the fact, that the high-value requirements were identified now, the performance of a classical prioritisation based on the factors shown in the beginning was possible.

Continual Prioritisation:

However, it is important to keep in mind that priorities might shift as more information becomes available and the context evolves.

5.3 How were requirements validated and verified?

Requirement Change Assessment:

By challenging the requirements within workshops and interviews with the different stakeholders, the requirements could have been adjusted and finally validated as well as verified. The output of this was a so-called requirement change assessment.

Acceptance and Evaluation Criteria:

In a next step, the requirements would have been approved by the different stakeholders by defining the acceptance and evaluation criteria, which would help to perform a decision analysis and therefore define the further steps of the project.

6 Solution Evaluation

As mentioned in the introduction, we used the Scrum methodology for this project. In our project, we took the current solution in each sprint and continuously gathered feedback from the stakeholders. These feedback loops have motivated us to constantly consider our problem and to work out the solution iteratively.

Our end product is composed of the requirements resulting from the stakeholder groups to create a possible draft that shows an approach to make technical informatics more interesting and understandable. Particular attention was paid to the stakeholder groups of lecturers who teach technical computer science subjects and exmatriculated and matriculated students. All our techniques described in the elicitation section rely on intensive communication with the stakeholders. In each sprint the requirements were revised until they were finally worked out in a final document together with a draft approach.

6.1 Sprint 1

In the first sprint, a document analysis was conducted and a student from the second semester of Business Information Technology was interviewed. According to this output, a first draft was created. The first draft shows that the self-contained modules should be broken up in an interdisciplinary project-based approach in order to show the students a big picture. As an example, the combination of Business, Software Engineering and IT Infrastructure / IT Security is used here.

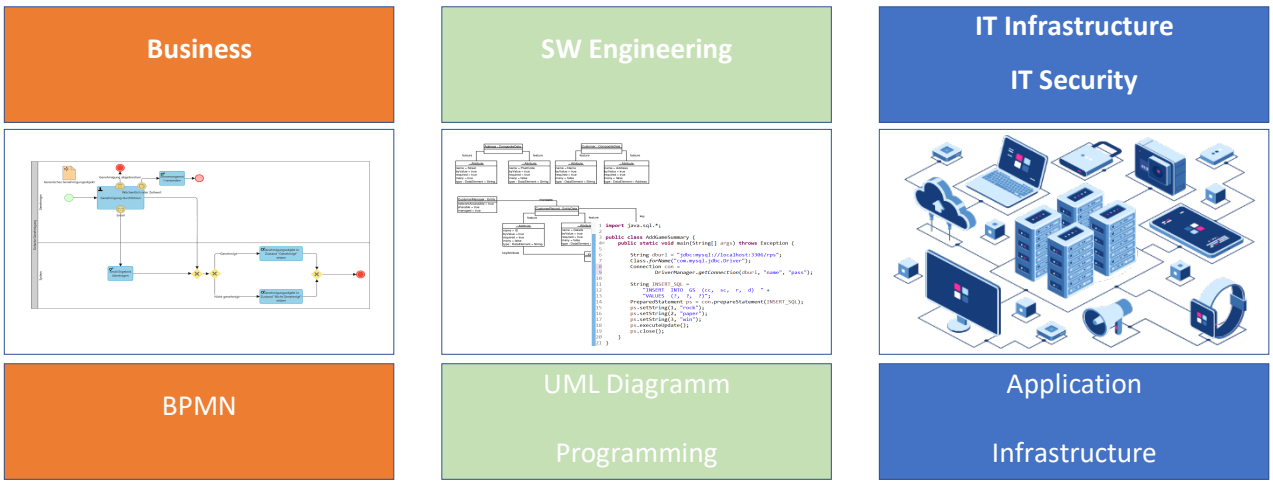


Figure 3: First draft

This draft was presented, discussed and assessed by Knut Hinkelmann, head of the course, sponsor and lecturer and a current BIT Student Dominik Meier.

6.2 Sprint 2

In the second sprint, further feedback was obtained on the current structure of the curriculum. Two surveys were carried out, one of them belonging to the stakeholder group of current and former students and the other to the stakeholder group of lecturers. Requirements were elicited from the results of the surveys. Based on this a second draft of the curriculum were designed.

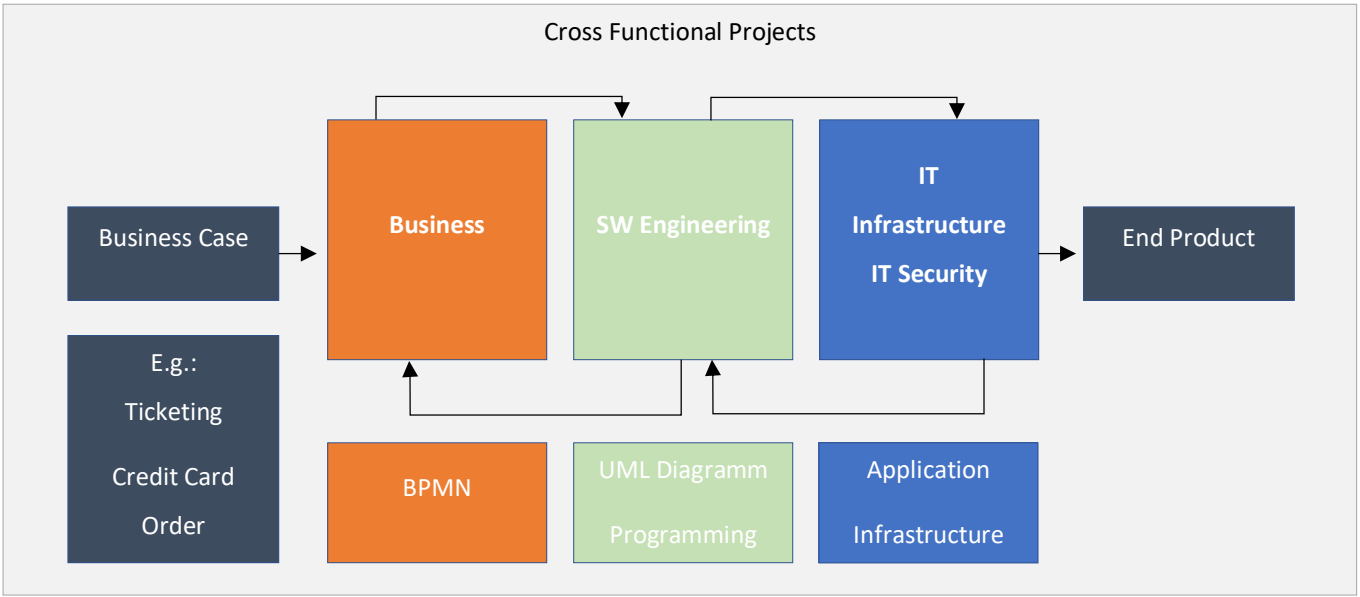


Figure 4: Second draft

Our first draft was confirmed by the requirements we received from the surveys. The draft was further elaborated. During their studies, students should be able to choose a business case, such as a ticketing system. This business case provides the basis for combining the disciplines of Business SW Engineering and IT Infrastructure / IT Security. At the end of each project is a final product. Through this procedure, the student gets a big picture and goes through an end-to-end approach from the business case to the final product.

The approach was discussed and evaluated in a focus group with Andreas Martin, lecturer for technical IT modules in Business Information Technology and Robin Attinkara a former Bachelor student BIT. Furthermore, further requirements were obtained which will be incorporated into the next and final design of the curriculum.

6.3 Sprint 3

The following figure 5 illustrates the study program as it currently looks like. It can be seen that the IT project where the programming knowledge has to be applied is relatively late and the disciplines of Business, Software Engineering and IT Infrastructure are treated separately from the IT Project.

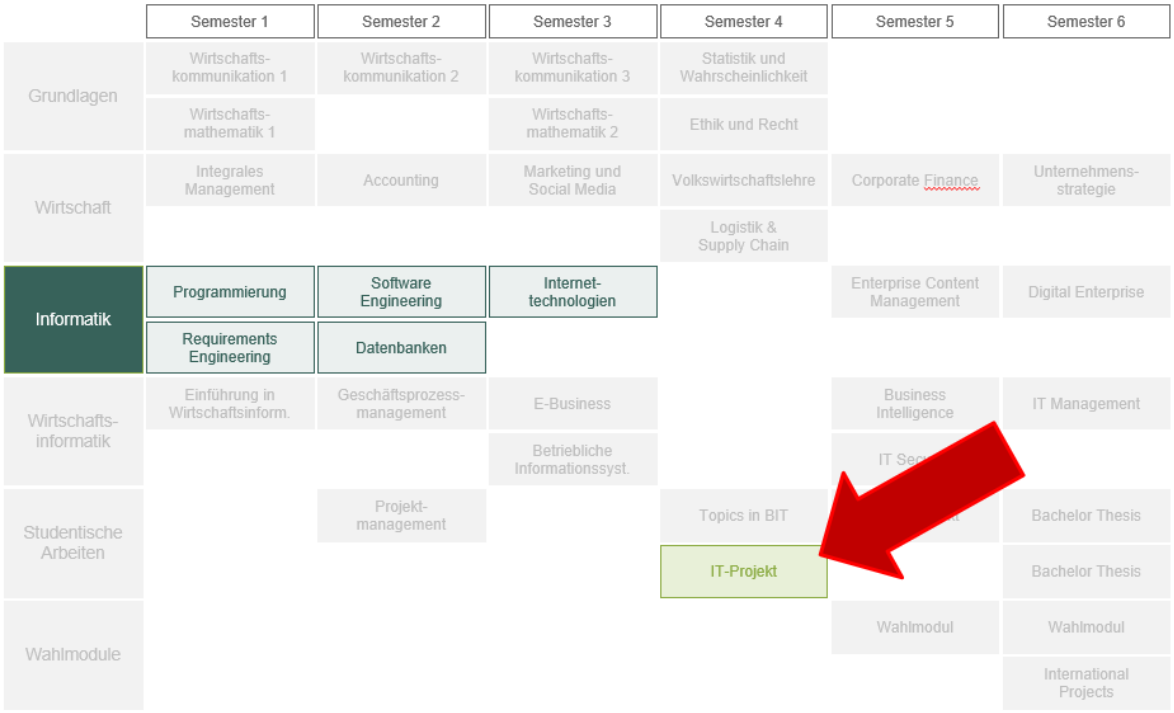


Figure 5: Current curriculum BIT

In the third and last sprint the final proposal of a curriculum was developed. Figure 6 illustrates a full-time study with six semesters. In the first semester the basics of every important domain (Business, SW Engineering and IT Infrastructure & Security) are taught on a general basis. This approach gives the student an impression and orientation how the study is structured and what the student can expect from the study. Starting in the second semester, students already start with the cross-module projects in the modules Business, Software Engineering and IT Infrastructure / Security in order to get to work on a real-case study, which should help to gain an understanding of the big picture. In addition, certain subjects will continue to be taught as normal and programming should be extended to several semesters, so the students have more time to get acquainted to the programming world. In the subjects that are relevant for the project, the last hour should be used to work on the projects and to ask the lecturer if necessary and to offer help. The cross-module project should end in the 4th

or 5th semester, in order to give the students a sense of accomplishment. The last two semester of the study program should give students the opportunity to select modules based on their interest and the field of area they want to focus in. This can be done by applying the principle from the BSc IM study program where students have to choose their focus field, so called major and minor, in which they want to develop further. Based on Andreas Martin, you can categorize BIT into different topics such as cybersecurity, data science, agile business analysis etc. This proposal of a new curriculum was first evaluated in a focus group with Robin Attinkara, former BIT student and Thanushan Kanagaratnam, current BIT student. In a final step it was presented to the sponsor.

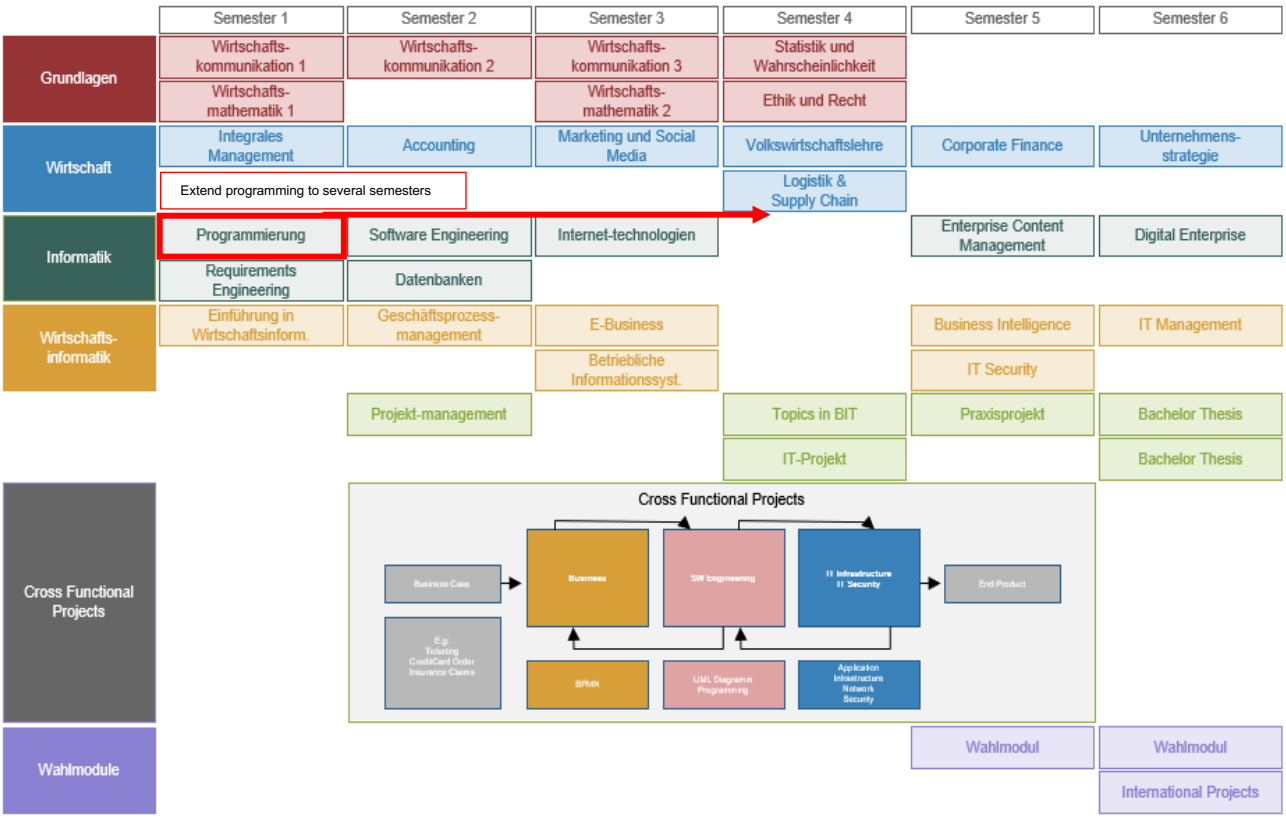


Figure 6: Final suggestion of a project-based curriculum

Our MVP has limitations as the teaching methods and tooling were neglected. Further, testing are required such as:

- Which tools are the most suitable for applying the curriculum?
- Which teaching methods (Kanban approach?) should be applied?

In order to achieve the desired final output.

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Figures